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Institute for Nuclear Physics
Experimental Hadron Dynamics (IKP-2)

Height and Weight of Healthy Persons

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Introduction

At present many people carry out their daily work, sitting for hours without physical exercise. Often they eat more and gain weight. Genetically we are hunters and collectors of berries, mushrooms and fruit, and we had a lot of hard work. In ancient times starvation periods occurred, and too much weight had never been a problem. Do we determine our weight occasionally now?

Our height changes only slowly while growing and ageing. How does the weight of a healthy individual depend on its body height? When observing people we realize: humans are quite different. Apart from the natural difference between males and females, people differ in body proportions. The body proportions of small children are very different from those of adults. But even persons with the same age and sex may have rather different body proportions. There are scrawny persons. Most humans are what we would call normal, and they have healthy weight. But too many weigh too much! They put additional load on essential parts of their body, challenge their health and cause immense health expenses.

What would be ideal? We have a natural feeling for which proportions we find harmonic or even beautiful. They satisfy the golden section or the golden ratio, „den goldenen Schnitt“, which implies that the naval height Hn is the golden section of the body height H:

$$H / Hn = Hn / (H - Hn) = R = 1.618034...$$

We call a body, which agrees with the golden section, ideal. Normal persons never satisfy the golden section perfectly. How close they come to it, is given by the individual body proportions, and these determine the human weight as function of the body height H.

Regarding human body weights, people often refer to the Broca formula (1), which relates body mass with body height:

For males: body height in cm, minus 100 = normal weight in kg.
For females: body height in cm, minus 100, minus 10 per cent = normal weight in kg.
Danger for health: if 10 per cent more.
Corpulent: if 20 per cent more.

This formula is obviously useful only in a very limited height region, because negative weights would result for individuals shorter than 100 cm,
The so called Body-Mass Index BMI (2) is more reliable. It yields the body mass M as 21.7 kg/m^2 times the square of the body height H. The quantity 21.7 kg/m^2 is the body mass index, mostly abbreviated as 21.7. Then 18.5 is considered as the limit to underweight, 24.9 as limit to overweight and 30.0 as limit to obesity.
There exists another formula which permits to calculate the body mass M as function of body height H, the ponderal index (3,4): M = ponderal index times the cube of H.

Whereas the dimension of the BMI is an areal density, the dimension of the ponderal index is a volume density. Where is an areal density relevant for the human body? The numerical value of the BMI does not change, if we replace mass by weight, for which the international standards (5) define the Newton N. One Newton = 1 kg mass times m/s^2. Previously the kg had also been used as weight unit. And that is still practical use. But the weight unit of one kg mass is called 1 kilopond = 1kp = 9.80665 N. If we still want to use the old kg weight instead of mass, we better replace the body mass index BMI by the body weight index BWI. The BWI has the dimension of weight / area, and that is pressure. Pressure is most relevant for the human body! Just consider the pressure in the spine, the hips, the knees, the feet, and the blood pressure.

The volume density is crucial for the human body. As people can swim, their volume density is quite close to that of water (1 kg mass / 1 liter), independently of whether they are slim or obese, short or tall. The ponderal index has the correct dimension! We call it body shape index, because this clarifies its meaning. The prerequisite for using the BSI is, that the human proportions remain constant while growing or ageing or between different individuals. If this is true, then the BSI is an exact body shape index. Of course, that is never exactly true, because we are not ideal individuals. But in regions of height or age, where the differences of the proportions are small, the BSI is a good body shape index, and a good approximation for calculation of the body mass or body weight (in kg) as function of the body height H (in m).

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Data

For the present study the interest was in the weight of normal and probably healthy persons. Therefore, data were needed on the heights, masses and ages of normal persons from birth until high age. The collected data comprise ~ 250 males and ~ 250 females. These data have been made available in part by pediatricians in Jülich, Germany, and Simmerrath, in the Eifel region near Juelich, and partially by the directors of schools in Jülich. The rest of the data was obtained by asking family members of the author, friends, co-workers, colleagues and other persons, whom the author knew or met on the road. The data of all of these persons have been listed in Excel tables, where also the individual BMI and BSI values are given.

Table 1 is for males with age up to 94 years, and
Table 2 is for females with age up to 87 years.

As the focus was on normal, healthy weight individuals, all persons asked by the author were selected visually, including slim, but not too slim individuals and including not too well padded people. Persons with BMI values above 30 have not been included in our analysis, nor have scrawny persons, because they are not considered as having healthy weight.

Results and Discussion

All data have been analyzed with the least squares method of Gauss (6). At first, a plot has been generated of the masses of the individuals as function of their body height, for males and females separately (Fig. 1). One observes a cloud of points. This is expected, because people are different. The spread of the points shows this natural difference. Because of this spread, there are regions, where any body mass formula is applicable. The Broca formula predicts correct weights e. g. in the height region around 1.25 m for males and females. However, a useful body mass index is supposed to be applicable in a wide region of heights or ages. Figure 1 shows that the BMI (15.96 for males and 15.22 for females) is useful for body heights of smaller children, from birth on up to heights of ~ 1.25 m, a much larger height region. For taller people the BSI (12.54 for males and 12.36 for females) fits the data best. Therefore, the BMI is the preferred body mass relationship for children shorter than ~ 1.25 m or younger than ~ 6 years. For taller persons the BSI is the better body mass index. In the figure, the BMI and BSI lines are drawn for the BMI and BSI indices which yield the best fits. Also the BMI line is drawn for the BMI value of 21.7. It is clearly seen that this BMI value suggests that persons smaller than about 1.6 m are underweight, and taller individuals are overweight. But the BSI is in full agreement with that they have normal weight.

Cole, Bellizi, Flegal and Dietz have studied cut off points of large cohorts of persons below 20 years of age (7). They only use the BMI for their analyses. For ages up to ~ 6 years, corresponding with heights up to ~ 1.25 m, we find excellent agreement with their results. These authors observe, that their BMI values increase for ages from ~ 6 years to ~ 20 years. As we use the BSI in this age region, we find that there is no increase for the BSI. This „discrepancy“ is only a mathematical effect, because the authors of Ref. 7 use the BMI, while we apply the BSI, which is the appropriate body mass index for persons taller than ~ 1.25 m and older than ~ 6 years.

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Figure 1. Body masses as function of body heights for males and females.

Individual body-masses are plotted *versus* body-heights for 246 males and for 257 females. In addition to the traditional BMI curve of 21.7, a BMI = 15.96 curve is shown for 63 males, a BMI = 15.22 curve for 66 females, the BSI = 12.54 curve for 183 males, and a BSI = 12.36 curve for 191 females. The figure shows that the tallest persons are systematically heavier than the BMI=21.7 predicts, and that shorter persons seem lighter. All persons with height above 1.25 m are quite well fitted by the BSI curves. Shorter individuals can roughly be described by a single BMI of 15.96 for males and 15.22 for females.

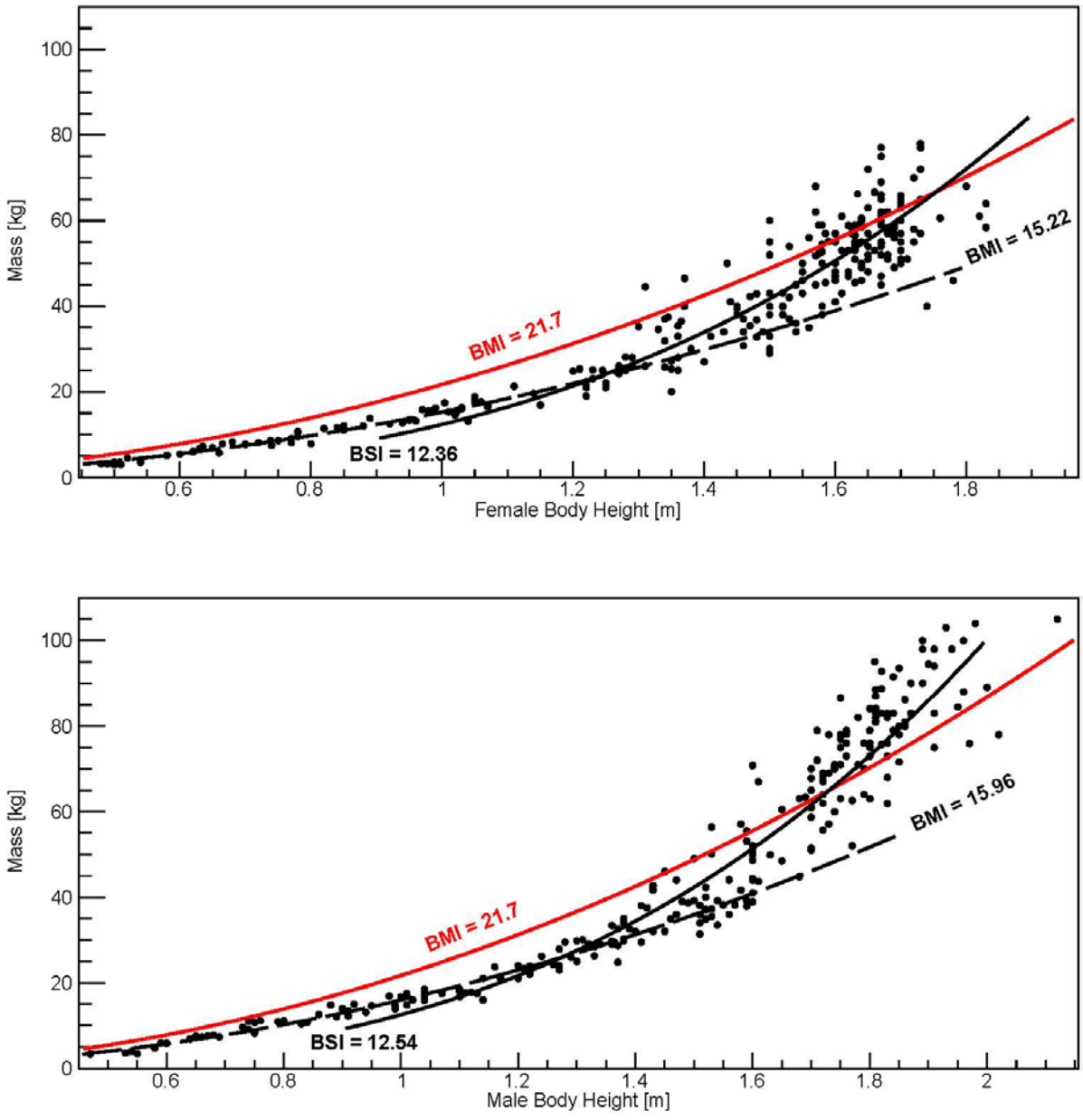

Table 1 Data about males

Listed are the primary data, the ages, weights and heights of the individuals, and the secondary data, the personal BMI and BSI values.

Age	Weight	Height	BMI	BSI
0,27	3,35	0,47	15,17	32,27
0	3,6	0,53	12,82	24,18
0,06	3,92	0,54	13,44	24,89
0,18	3,41	0,545	11,48	21,07
0,1	4,73	0,58	14,06	24,24
0,25	5,93	0,59	17,04	28,87
0,25	5,86	0,6	16,28	27,13
0,25	6,89	0,64	16,82	26,28
0,33	7,47	0,65	17,68	27,20
0,33	7,55	0,65	17,87	27,49
0,5	7,35	0,66	16,87	25,57
0,41	7,56	0,665	17,10	25,71
0,25	7,8	0,68	16,87	24,81
0,75	7,34	0,69	15,42	22,34
0,83	9,64	0,73	18,09	24,78
0,6	9,1	0,74	16,62	22,46
1	10,95	0,74	20,00	27,02
0,56	8,23	0,75	14,63	19,51
0,6	10,75	0,75	19,11	25,48
0,67	8,5	0,75	15,11	20,15
1	11,1	0,76	19,22	25,29
0,92	10,9	0,79	17,47	22,11
0,83	11,1	0,8	17,34	21,68
0,8	10,4	0,83	15,10	18,19
1,11	10,8	0,84	15,31	18,22
1,11	12,6	0,86	17,04	19,81
2	14,8	0,88	19,11	21,72
1,11	12	0,89	15,15	17,02
2,1	14	0,895	17,48	19,53
2	13,5	0,905	16,48	18,21
1,92	12,25	0,91	14,79	16,26
2	15	0,92	17,72	19,26
3,3	13,1	0,935	14,98	16,03
3,16	14,6	0,95	16,18	17,03
2,11	16,9	0,98	17,60	17,96
1,11	13,9	0,99	14,18	14,33
3,1	14,6	0,99	14,90	15,05
3	16,6	1	16,60	16,60
4	16,7	1	16,70	16,70
3	14,8	1,01	14,51	14,36
3,1	17,5	1,01	17,16	16,99
2,11	16	1,02	15,38	15,08
2,11	17,4	1,04	16,09	15,47
4	15,9	1,04	14,70	14,14
5	17	1,04	15,72	15,11

5,4	18,5	1,04	17,10	16,45
5,1	17,5	1,07	15,29	14,29
4,1	18,1	1,095	15,10	13,79
3,11	18,5	1,1	15,29	13,90
5,8	16,7	1,1	13,80	12,55
5,1	17,7	1,11	14,37	12,94
5,2	17,8	1,12	14,19	12,67
5	17,5	1,13	13,71	12,13
6,1	21	1,135	16,30	14,36
5,5	16	1,14	12,31	10,80
7	23,7	1,155	17,77	15,38
5	21	1,17	15,34	13,11
6	24	1,2	16,67	13,89
7	21	1,2	14,58	12,15
7,1	23,4	1,205	16,12	13,37
7,5	23,9	1,215	16,19	13,33
8	22	1,22	14,78	12,12
7	26,2	1,24	17,04	13,74
7,4	24,3	1,264	15,21	12,03
7	23	1,27	14,26	11,23
7	27,9	1,27	17,30	13,62
7,8	24	1,27	14,88	11,72
8	23	1,27	14,26	11,23
9,7	29,5	1,28	18,01	14,07
7	26	1,29	15,62	12,11
6	29,8	1,3	17,63	13,56
7	25	1,3	14,79	11,38
7	30	1,31	17,48	13,34
7	29,1	1,32	16,70	12,65
9,5	26,3	1,33	14,87	11,18
9,75	28,4	1,33	16,06	12,07
7	29	1,34	16,15	12,05
7,8	33,4	1,36	18,06	13,28
8	29,7	1,36	16,06	11,81
9	29	1,36	15,68	11,53
7	24,8	1,37	13,21	9,64
9,3	28,7	1,37	15,29	11,16
10	32,6	1,37	17,37	12,68
8	30,2	1,38	15,86	11,49
8	35	1,38	18,38	13,32
8	29,8	1,38	15,65	11,34
9,6	34	1,38	17,85	12,94
10	29,8	1,38	15,65	11,34
10	32,6	1,39	16,87	12,14
11	32	1,4	16,33	11,66
9,6	29,5	1,41	14,84	10,52
12,9	38	1,41	19,11	13,56
9,7	37,5	1,415	18,73	13,24
8,9	41,7	1,43	20,39	14,26
9	32	1,43	15,65	10,94
9,3	42,7	1,43	20,88	14,60
10,1	46	1,45	21,88	15,09
12,1	32	1,45	15,22	10,50
12,7	35	1,46	16,42	11,25

12,2	44	1,47	20,36	13,85
12,8	36	1,47	16,66	11,33
9,7	39	1,48	17,80	12,03
12	38,7	1,485	17,55	11,82
11	39,2	1,5	17,42	11,61
12,5	49	1,5	21,78	14,52
10	38,1	1,51	16,71	11,07
11	34	1,51	14,91	9,88
11,9	36	1,51	15,79	10,46
12	31,4	1,51	13,77	9,12
11,5	37	1,52	16,01	10,54
12	37,2	1,52	16,10	10,59
12	34,9	1,52	15,11	9,94
12	42,3	1,52	18,31	12,05
13	40	1,52	17,31	11,39
11	50,2	1,53	21,44	14,02
11	37,3	1,53	15,93	10,41
12	56,4	1,53	24,09	15,75
13	35,5	1,53	15,17	9,91
11	33,5	1,54	14,13	9,17
11	39,2	1,54	16,53	10,73
13	38,2	1,55	15,90	10,26
11	44	1,56	18,08	11,59
11	44,1	1,56	18,12	11,62
14	36	1,56	14,79	9,48
12	38,2	1,57	15,50	9,87
12	57,1	1,575	23,02	14,61
12	41,7	1,58	16,70	10,57
12,3	39,2	1,585	15,60	9,84
11	37,9	1,59	14,99	9,43
11	55,5	1,59	21,95	13,81
13	53,1	1,59	21,00	13,21
10	50	1,6	19,53	12,21
11	51,1	1,6	19,96	12,48
12	44	1,6	17,19	10,74
12	44,4	1,6	17,34	10,84
12	48,6	1,6	18,98	11,87
12	52	1,6	20,31	12,70
12	38,9	1,6	15,20	9,50
12,4	41	1,6	16,02	10,01
61	70,8	1,6	27,66	17,29
12	67	1,61	25,85	16,05
13	43,7	1,61	16,86	10,47
10	49,9	1,63	18,78	11,52
12	48,5	1,65	17,81	10,80
37	60,5	1,65	22,22	13,47
12	44,8	1,68	15,87	9,45
77	63	1,68	22,32	13,29
74	63,4	1,69	22,20	13,13
30	61	1,695	21,23	12,53
31	58,7	1,695	20,43	12,05
81	67,8	1,695	23,60	13,92
16	51,5	1,7	17,82	10,48
48	65	1,7	22,49	13,23
15	51	1,7	17,65	10,38

59	70	1,7	24,22	14,25
41	72	1,71	24,62	14,40
80	79	1,71	27,02	15,80
13,3	55,7	1,72	18,83	10,95
26	64	1,72	21,63	12,58
64	68	1,72	22,99	13,36
70	69	1,72	23,32	13,56
75	67	1,72	22,65	13,17
87	62	1,72	20,96	12,18
14	57,1	1,73	19,08	11,03
62	78	1,73	26,06	15,06
90	69	1,73	23,05	13,33
13,5	70,6	1,74	23,32	13,40
13,7	70	1,74	23,12	13,29
28	60	1,74	19,82	11,39
80	71	1,74	23,45	13,48
29	77	1,745	25,29	14,49
44	63	1,75	20,57	11,76
46	75	1,75	24,49	13,99
64	78	1,75	25,47	14,55
71	71	1,75	23,18	13,25
85	86,6	1,75	28,28	16,16
27	78,6	1,76	25,37	14,42
51	79	1,76	25,50	14,49
63	78,1	1,76	25,21	14,33
72	73	1,76	23,57	13,39
83	76	1,76	24,54	13,94
94	62,6	1,765	20,09	11,39
14	52	1,77	16,60	9,38
32	82	1,78	25,88	14,54
48	71	1,78	22,41	12,59
28	70	1,79	21,85	12,21
69	76	1,79	23,72	13,25
76	64	1,79	19,97	11,16
14	75,1	1,8	23,18	12,88
22	73	1,8	22,53	12,52
25	76	1,8	23,46	13,03
40	79	1,8	24,38	13,55
48	84,1	1,8	25,96	14,42
48	63	1,8	19,44	10,80
48	75	1,8	23,15	12,86
56	75	1,8	23,15	12,86
25	82	1,81	25,03	13,83
62	81	1,81	24,72	13,66
73	87	1,81	26,56	14,67
75	83	1,81	25,34	14,00
75	88,5	1,81	27,01	14,92
81	95	1,81	29,00	16,02
81	87	1,81	26,56	14,67
82	81	1,81	24,72	13,66
84	84,2	1,81	25,70	14,20
44	75,7	1,815	22,98	12,66
43	83	1,82	25,06	13,77
49	88,7	1,82	26,78	14,71
63	92,8	1,82	28,02	15,39

16	61,9	1,83	18,48	10,10
36	73	1,83	21,80	11,91
41	82	1,83	24,49	13,38
65	83	1,83	24,78	13,54
70	68	1,83	20,31	11,10
81	76	1,83	22,69	12,40
42	83	1,84	24,52	13,32
74	91,5	1,84	27,03	14,69
90	79	1,84	23,33	12,68
47	78	1,85	22,79	12,32
53	80	1,85	23,37	12,63
63	93,5	1,85	27,32	14,77
64	71,6	1,852	20,88	11,27
44	81	1,86	23,41	12,59
64	86,2	1,86	24,92	13,40
80	80	1,86	23,12	12,43
77	83	1,865	23,86	12,80
72	90	1,87	25,74	13,76
21	90	1,89	25,20	13,33
40	98	1,89	27,43	14,52
41	100	1,89	27,99	14,81
49	98	1,89	27,43	14,52
52	94,5	1,895	26,32	13,89
18	75	1,91	20,56	10,76
46	94	1,91	25,77	13,49
56	98	1,91	26,86	14,06
59	83	1,91	22,75	11,91
37	103	1,93	27,65	14,33
71	98	1,94	26,04	13,42
15	84,5	1,95	22,22	11,40
21	88	1,96	22,91	11,69
51	100	1,96	26,03	13,28
35	75,9	1,97	19,56	9,93
44	104	1,98	26,53	13,40
32	89	2	22,25	11,13
33	78	2,02	19,12	9,46
30	105	2,12	23,36	11,02

Table 2 Data about females

Listed are the primary data, the ages, weights and heights of the individuals, and the secondary data, the personal BMI and BSI values.

Age	Weight	Height	BMI	BSI
0	3,16	0,48	13,72	28,57
0	3,13	0,49	13,04	26,60
0	3,5	0,5	14,00	28,00
0,1	2,92	0,5	11,68	23,36
0	2,99	0,51	11,50	22,54
0	4,456	0,52	16,48	31,69
0	3,54	0,54	12,14	22,48
0,1	5,1	0,58	15,16	26,14
0,3	5,45	0,6	15,14	25,23
0,3	6,01	0,62	15,63	25,22
0,4	5,93	0,62	15,43	24,88
0,24	6,63	0,63	16,70	26,52
0,4	6,73	0,63	16,96	26,91
0,41	7,2	0,635	17,86	28,12
0,4	6,91	0,65	16,36	25,16
0,5	5,7	0,66	13,09	19,83
0,5	7,8	0,665	17,64	26,52
0,5	8,3	0,68	17,95	26,40
0,83	7,7	0,7	15,71	22,45
0,83	8,11	0,72	15,64	21,73
0,91	7,45	0,74	13,60	18,38
1	8,4	0,74	15,34	20,73
1	8,55	0,75	15,20	20,27
0,83	9,06	0,77	15,28	19,87
1	8,1	0,77	13,66	17,74
0,83	9,55	0,78	15,70	20,12
1	10,5	0,78	17,26	22,13
1,92	10,7	0,78	17,59	22,55
1	7,8	0,8	12,19	15,23
2	11,4	0,82	16,95	20,68
2	11,65	0,84	16,51	19,66
2	11,1	0,85	15,36	18,07
2	12	0,85	16,61	19,54
2	12	0,88	15,50	17,61
3,33	13,8	0,89	17,42	19,58
3	12,5	0,92	14,77	16,05
2,8	12,7	0,94	14,37	15,29
2,1	13,4	0,95	14,85	15,63
4	13,2	0,96	14,32	14,92
3,3	15,8	0,97	16,79	17,31
5	15,5	0,98	16,14	16,47
2,92	16,2	0,99	16,53	16,70
4	17,4	1,004	17,26	17,19
4,1	15,3	1,01	15,00	14,85
3,1	14,6	1,02	14,03	13,76
4	15,7	1,025	14,94	14,58
3	16	1,03	15,08	14,64

3,11	16,3	1,03	15,36	14,92
5,2	13,1	1,04	12,11	11,65
4	18,8	1,05	17,05	16,24
5	17,6	1,05	15,96	15,20
4	17,6	1,06	15,66	14,78
5	16,5	1,07	14,41	13,47
6	16,9	1,07	14,76	13,80
3,1	21,3	1,11	17,29	15,57
4,4	19,6	1,14	15,08	13,23
6,5	16,9	1,15	12,78	11,11
7,1	24,8	1,2	17,22	14,35
6,1	25,3	1,21	17,28	14,28
6	19	1,22	12,77	10,46
6	22,3	1,22	14,98	12,28
7	22	1,22	14,78	12,12
8	21	1,22	14,11	11,56
5,9	25,1	1,23	16,59	13,49
7	23	1,23	15,20	12,36
7,2	25	1,245	16,13	12,95
6	21	1,25	13,44	10,75
6	22	1,25	14,08	11,26
7	24,2	1,27	15,00	11,81
7,1	25,8	1,27	16,00	12,60
8	26	1,27	16,12	12,69
8	25	1,28	15,26	11,92
9	28,1	1,28	17,15	13,40
6,8	28	1,29	16,83	13,04
10	26	1,29	15,62	12,11
9,8	35,2	1,3	20,83	16,02
7	26	1,31	15,15	11,57
8	44,5	1,31	25,93	19,79
8,7	34,6	1,33	19,56	14,71
9	31,9	1,34	17,77	13,26
9,1	37	1,34	20,61	15,38
9,5	25,8	1,34	14,37	10,72
7,7	37,4	1,345	20,67	15,37
6	20	1,35	10,97	8,13
7	27,2	1,35	14,92	11,06
9,1	25,3	1,35	13,88	10,28
7,11	35,4	1,36	19,14	14,07
9	33	1,36	17,84	13,12
9,8	25	1,36	13,52	9,94
11	28	1,36	15,14	11,13
9,25	36,5	1,365	19,59	14,35
8	46,5	1,37	24,77	18,08
9,2	40	1,37	21,31	15,56
9,8	30	1,38	15,75	11,42
8	27	1,4	13,78	9,84
11	27	1,4	13,78	9,84
10	33	1,41	16,60	11,77
11	34	1,43	16,63	11,63
12,3	50	1,435	24,28	16,92
10	41	1,44	19,77	13,73
9	40	1,45	19,02	13,12
10,1	39,5	1,45	18,79	12,96

11	38	1,45	18,07	12,46
8	34	1,46	15,95	10,92
11	37	1,46	17,36	11,89
12	30,8	1,46	14,45	9,90
9	35,4	1,47	16,38	11,14
12	42,2	1,47	19,53	13,28
11	32,8	1,48	14,97	10,12
11	36,8	1,48	16,80	11,35
12	42,9	1,48	19,59	13,23
10	34	1,49	15,31	10,28
10	43	1,5	19,11	12,74
10	29	1,5	12,89	8,59
11	33	1,5	14,67	9,78
11	40	1,5	17,78	11,85
11	30	1,5	13,33	8,89
12,1	38	1,5	16,89	11,26
14	60	1,5	26,67	17,78
79	55	1,5	24,44	16,30
87	52	1,5	23,11	15,41
10	38	1,52	16,45	10,82
11	40	1,52	17,31	11,39
11	43,1	1,52	18,65	12,27
12	39,9	1,52	17,27	11,36
10	37	1,53	15,81	10,33
10	42	1,53	17,94	11,73
55	54	1,53	23,07	15,08
11	34	1,54	14,34	9,31
12	36	1,54	15,18	9,86
70	45	1,54	18,97	12,32
10	50	1,55	20,81	13,43
12,3	46	1,55	19,15	12,35
13	48	1,55	19,98	12,89
13,3	43	1,55	17,90	11,55
11	35	1,56	14,38	9,22
77	56	1,56	23,01	14,75
77	56	1,56	23,01	14,75
12,2	62	1,57	25,15	16,02
12,7	68	1,57	27,59	17,57
13,5	51,8	1,57	21,02	13,39
14	45	1,57	18,26	11,63
30	52,3	1,575	21,08	13,39
86	59	1,575	23,78	15,10
12,2	59	1,58	23,63	14,96
12,5	50	1,58	20,03	12,68
13	40	1,58	16,02	10,14
13	38	1,58	15,22	9,63
14,5	52,7	1,58	21,11	13,36
43	54,5	1,58	21,83	13,82
12,5	45,5	1,585	18,11	11,43
73	57	1,585	22,69	14,31
20	55,1	1,59	21,80	13,71
12,1	41	1,6	16,02	10,01
14	48	1,6	18,75	11,72
14	46	1,6	17,97	11,23
28	47	1,6	18,36	11,47

28	47	1,6	18,36	11,47
40	55	1,6	21,48	13,43
42	50	1,6	19,53	12,21
62	57	1,6	22,27	13,92
14	43	1,61	16,59	10,30
14	53	1,61	20,45	12,70
60	61	1,61	23,53	14,62
13	48	1,62	18,29	11,29
13,1	58,9	1,62	22,44	13,85
14	47	1,62	17,91	11,05
23	53	1,62	20,20	12,47
12,2	57	1,625	21,59	13,28
45	58,5	1,625	22,15	13,63
13	54	1,63	20,32	12,47
13	59	1,63	22,21	13,62
13	45,5	1,63	17,13	10,51
14	55	1,63	20,70	12,70
14	54	1,63	20,32	12,47
18	56,5	1,63	21,27	13,05
65	53	1,63	19,95	12,24
74	51	1,63	19,20	11,78
76	53,5	1,63	20,14	12,35
64	66,2	1,634	24,79	15,17
14	59	1,64	21,94	13,38
14	50	1,64	18,59	11,34
14	50	1,64	18,59	11,34
14	60	1,64	22,31	13,60
24	49	1,64	18,22	11,11
38	60,6	1,64	22,53	13,74
56	58,5	1,64	21,75	13,26
56	58,5	1,64	21,75	13,26
80	46	1,64	17,10	10,43
84	55	1,64	20,45	12,47
14	52	1,65	19,10	11,58
14	51	1,65	18,73	11,35
14	48	1,65	17,63	10,69
18	72	1,65	26,45	16,03
38	57	1,65	20,94	12,69
60	54	1,65	19,83	12,02
80	63	1,65	23,14	14,02
14	53	1,66	19,23	11,59
14	53	1,66	19,23	11,59
14,1	66,6	1,66	24,17	14,56
13	47	1,67	16,85	10,09
14	52	1,67	18,65	11,16
14	65	1,67	23,31	13,96
14	45	1,67	16,14	9,66
14	54	1,67	19,36	11,59
15	59	1,67	21,16	12,67
26	62	1,67	22,23	13,31
39	77,1	1,67	27,65	16,55
45	75	1,67	26,89	16,10
50	69	1,67	24,74	14,81
71	54,6	1,67	19,58	11,72
71	55	1,67	19,72	11,81

74	61	1,67	21,87	13,10
80	54	1,67	19,36	11,59
81	66	1,67	23,67	14,17
85	60	1,67	21,51	12,88
13	52	1,68	18,42	10,97
14	51	1,68	18,07	10,76
18	57	1,68	20,20	12,02
30	58	1,68	20,55	12,23
36	57	1,68	20,20	12,02
38	58,3	1,68	20,66	12,30
53	62	1,68	21,97	13,08
13,2	59	1,69	20,66	12,22
14	58,4	1,69	20,45	12,10
14	56	1,69	19,61	11,60
14	49	1,69	17,16	10,15
43	57	1,69	19,96	11,81
13	53	1,7	18,34	10,79
13	63	1,7	21,80	12,82
13	50	1,7	17,30	10,18
13	55	1,7	19,03	11,19
14	51	1,7	17,65	10,38
14	50	1,7	17,30	10,18
14	50	1,7	17,30	10,18
14	50	1,7	17,30	10,18
15	64	1,7	22,15	13,03
15	65	1,7	22,49	13,23
15,6	55	1,7	19,03	11,19
14,1	60	1,7	20,76	12,21
19	57	1,7	19,72	11,60
37	65,9	1,7	22,80	13,41
57	51	1,71	17,44	10,20
25	55	1,72	18,59	10,81
40	58	1,72	19,61	11,40
54	70	1,72	23,66	13,76
41	72	1,73	24,06	13,91
42	77	1,73	25,73	14,87
45	57	1,73	19,05	11,01
55	65	1,73	21,72	12,55
77	78	1,73	26,06	15,06
13,7	40	1,74	13,21	7,59
14,1	60,6	1,76	19,56	11,12
13,7	46	1,78	14,52	8,16
40	68	1,8	20,99	11,66
22	61	1,82	18,42	10,12
28	64	1,83	19,11	10,44
33	58,4	1,83	17,44	9,53

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